



Surveying Fish and Amphibians in Missouri Wetlands: Gear Findings

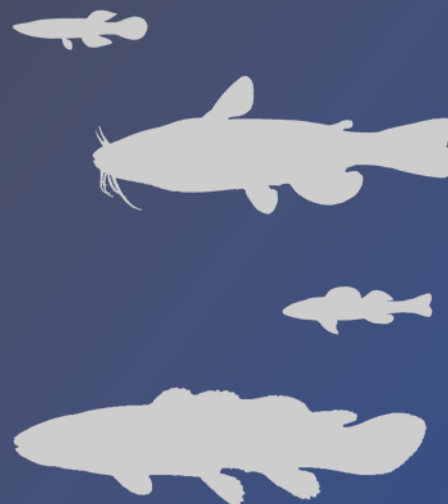
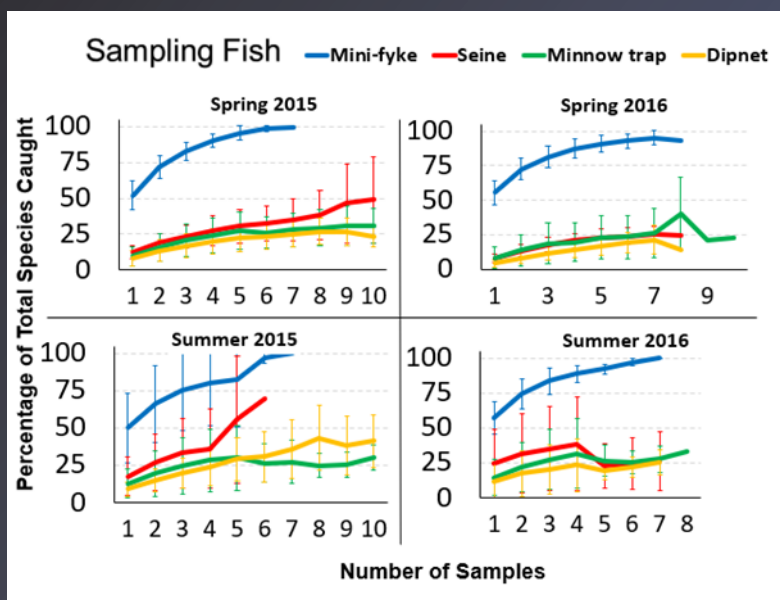


Figure 1. Species accumulation curves of fish species for the four sampling methods. Each line is the mean percentage of species caught across wetlands from all study areas in the state of Missouri, 2015-2016 (Error bars show standard deviation). Mini-fyke nets were the most efficient for catching fish across all seasons.

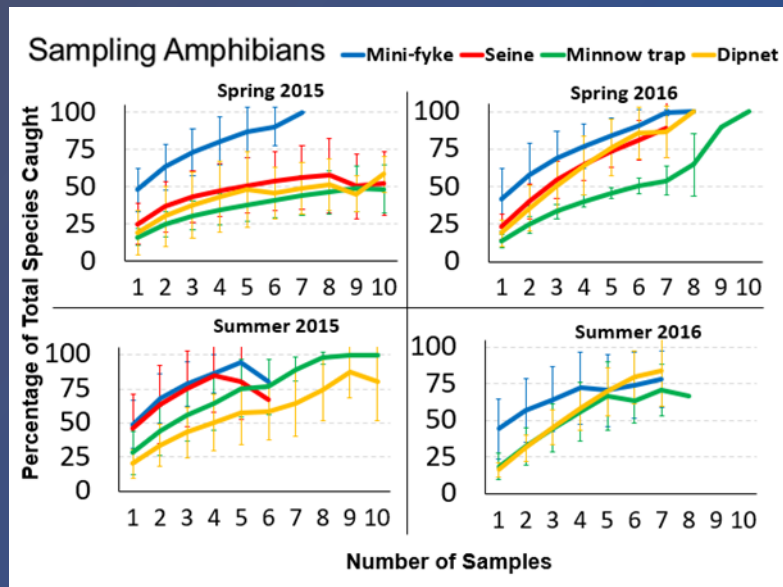


Figure 2. Species accumulation curves of amphibian species for the four sampling methods. Each line is the mean percentage of species caught across wetlands from all study areas in the state of Missouri, 2015-2016 (Error bars show the standard deviation). Mini-fyke nets caught more total amphibians in 3 out of 4 seasons.

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Background Information:

A common assumption of seasonal wetland management is that visible and abundant species, like waterbirds, are indicators of a broader community of wetland dependent species that benefit from intensive management. However, there is a degree of uncertainty as to what other species are present and how they may be influenced by various management decisions. Periodic monitoring of cryptic species, like fish and amphibians, can help document these species and inform biologists of the broader wetland community as they seasonally manipulate and mimic wetland conditions in Missouri's altered floodplains. We wanted to identify the most efficient and effective method to survey fish and amphibian communities in wetland impoundments so we evaluated and compared four different sampling techniques.

Methods and Results:

We sampled 29 wetlands across three ecoregions in Missouri during 2015-2016 with four aquatic sampling methods (mini-fyke nets, minnow traps, dipnets, and seines) to detect fish and amphibian species. We assessed the influence of sampling method, temporal (spring and summer of 2015 and 2016) and regional variation, and within wetland habitat characteristics on the number of fish species detected. We also used a resampling procedure to determine the sampling effort needed to detect wetland fish and amphibian species richness (Kamps 2017).

- In general, 6-7 mini-fyke nets detected a greater percentage of fish and amphibian species than other gears during most of the seasonal sampling periods
- Mini-fyke nets detected larger sized fish and fish across a greater size range regardless of changes in vegetation cover or water depth.
- Detection of unique species, those only detected by one method, varied among taxonomic groups. Unique fish species, including species of conservation concern, were detected with mini-fyke nets. However, unique amphibian species were detected by a range of different methods including mini-fyke nets, dipnets, and minnow traps.
- To optimize detection of amphibian communities, a combination of mini-fyke nets and dipnet or minnow trap samples is likely necessary.

Habitat Related Findings

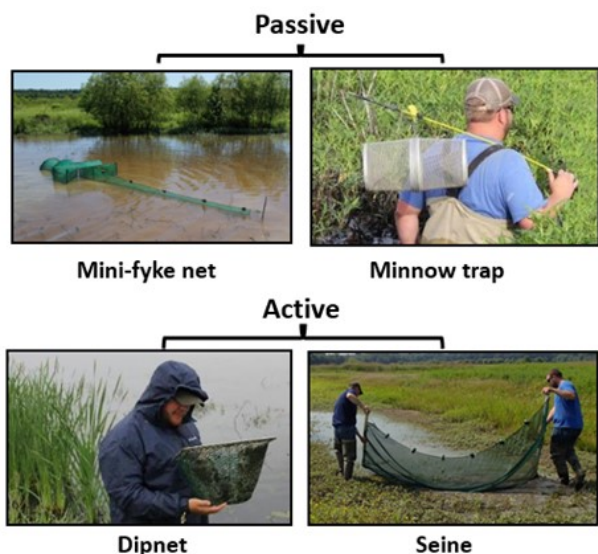
- The number of fish species detected decreased with increasing distance from shore.
- The number of amphibian species was negatively associated with water depth.
- The number of fish and amphibian species detected by any method increased with increasing wetland species richness.
- The influence of percent vegetation cover and water depth was dependent upon the method.

Timing Related Findings

- We caught greater numbers of individual fish during summer sampling seasons, preceding floods, while total number of species detected fluctuated across season.
- The number of amphibian species detected fluctuated across years and regions.

Implications:

Identifying a project's objectives are first and foremost. Once this has been decided, applying the findings of this study can help in selecting the most appropriate and efficient methodology for sampling fish and amphibians. The use and intensity of a singular gear or a combination of gears will influence results. The location within habitats and timing is also critical. Considering these factors along with your objectives will assist in determining the best means to collect pertinent information.



Gear Related Findings (Figures 1 and 2 on front page)

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Keywords: wetland sampling, monitoring, fish, amphibians